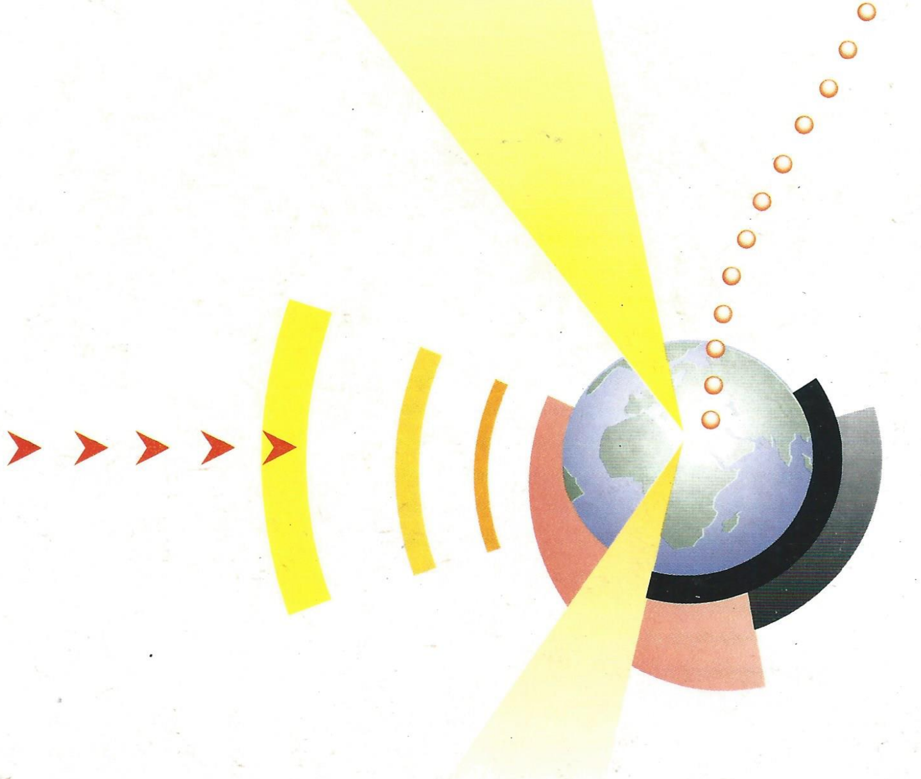
NOTEBOOK COMPUTER

3600

Hardware User's Manual



3600

Notebook Computer User's Manual

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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1. Follow all warnings and instructions marked on this product.
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3. Do not set this product near water.
4. Operate this product in accordance with its rated power specifications. If you are unsure of your local power specifications, consult your dealer or local power company.
5. This product is equipped with a 3-prong grounding plug. This is an important safety feature; do not defeat its purpose. If you do not have access to such power, have a qualified electrician install a proper outlet.
6. When you want to unplug the product, be sure to disconnect the power cord from the wall socket by its plug not by its wire.
7. Unplug this product from the wall outlet before cleaning it. Do not apply cleaner directly to the product. Do not use volatile or abrasive cleaners on the product.
8. The openings on the top cover, the right panel, and the left panel are provided for ventilation; to ensure reliable operation of this product and to protect it from overheating, the openings must not be blocked or covered. This product should never be placed near or over a radiator or a heat register, or in a built-in installation where proper ventilation is not provided.
9. Keep the product away from high capacity transformers, electric motors, and other strong magnetic fields.
10. Do not allow anything to rest on the power cord or the AC/DC adapter. Do not locate this product where persons will likely walk on them.

11. If an extension cord is used with this product, make sure that the total current drawn by the products plugged into the extension cord does not exceed the extension cord or outlet power rating.
12. Never spill liquid of any kind onto or into the product.
13. Do not attempt to service this product yourself. You may be exposed to dangerous points or other risks during the process of disassembling the product. Refer all servicing to qualified service personnel.
14. Unplug this product from the wall outlet and refer servicing to qualified service personnel under any of the following conditions:
    a. When the power cord or AC/DC adapter is damaged or frayed.
    b. If liquid has been spilled into this product.
    c. If this product has been exposed to rain or water.
    d. If this product does not operate normally when the operating instructions are followed.
    e. If this product has been dropped or damaged.
    f. If this product exhibits a distinct change in performance, indicating a need for service.
15. Do not use any battery pack other than the one specifically designed for this product. Batteries may explode or leak if exposed to fire or improperly handled or discarded. Refer any battery pack repair or replacement job to your dealer or qualified service personnel.
16. The battery on the system board may explode if mistreated. Do not recharge, disassemble or dispose of any used battery in fire. Keep children away from and promptly dispose of any used battery.
17. Use only a power supply cord of the proper type. It should be a detachable type. UL listed/CSA certified, type SVT/SJT, rated 6A 250V minimum, VDE approved, or its equivalent. Minimum length is 6 feet.

About This Manual

This manual is intended for the 3600 Notebook Computer user. It is organized in such a way that you can easily locate the information you wish to look up. The following information is included:

> ***Chapter 1***, *Introduction*, provides general information about your system.
>
> ***Chapter 2***, *Power Source*, describes how to use either AC power or battery power to operate the notebook.
>
> ***Chapter 3***, *System Description*, takes a glance at the notebook's system unit and describes its key parts.
>
> ***Chapter 4***, *Operation*, provides instructions on basic system operation.
>
> ***Appendices A-D*** provide information on system specifications, I/O port connectors, video modes of operation, and keyboard scan and ASCII codes.
>
> ***The Glossary*** provides definitions for terminology that may be new to you.

This manual is intended for two types of readers:

- Readers with no software designing and programming purposes in mind, such as users who wish to run ready-made or custom-designed software packages.
- Readers with sufficient computer science background, such as program designers and programmers who wish to develop software or firmware programs.

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Glossary

Introduction

1

Introduction

Overview

The innovative 3600 Notebook Computer is a Pentium-based, desktop-power packed, and battery-operable personal computer.

To serve introductory purposes, this chapter begins with an unpacking checklist, then briefly describes its standard features, and concludes with information on system upgrade possibilities.

Unpacking Checklist

After unpacking the shipping box, please first check against **Figure 1-1** to see if the following items are present and in good condition. If you find any of the listed items missing or damaged, please immediately contact your dealer for assistance. In addition, be sure to store all packaging materials in a safe place for future use in repacking and shipping.

1. *notebook computer*
2. *AC/DC adapter*
3. *AC power cord*
4. *5- to 6-pin transfer cable*
5. *two user's manuals*
6. *five utilities diskettes*
7. *carrying bag*

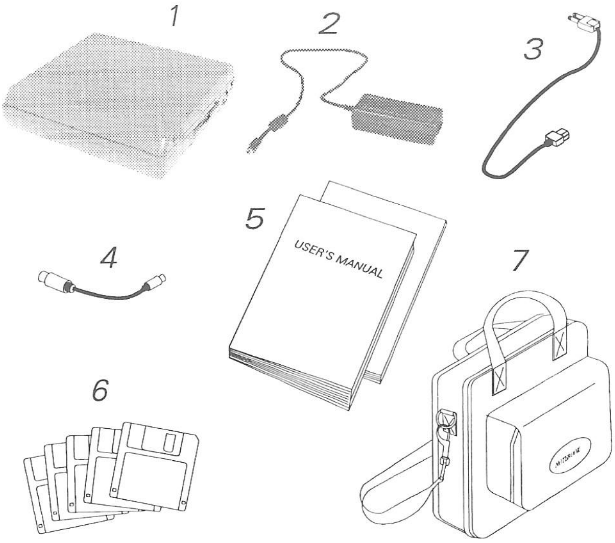


Figure 1-1 *Unpacking checklist*

Taking a First Look

The 3600 is representative of the newest generation of Windows-friendly notebook computers in that it is designed around Intel's high-performance CPU, Pentium, features an audio unit, and incorporates various performance-boost implementations such as VL bus video and IDE interfaces, Windows graphics performance enhancement features, intelligent power management, and PCMCIA support.

In addition, the notebook comes standard with an audio unit and features an optional docking station which can accommodate a CD-ROM drive. Combined with the optional docking station, the whole system can deliver multimedia capabilities in a more compact package.

The following subsections will provide you information on

- *Parts locations.*
- *Standard configuration.*
- *System upgradability.*

Parts Locations

Figure 1-2 and **1-3** illustrate the locations of the major parts which make up the notebook.

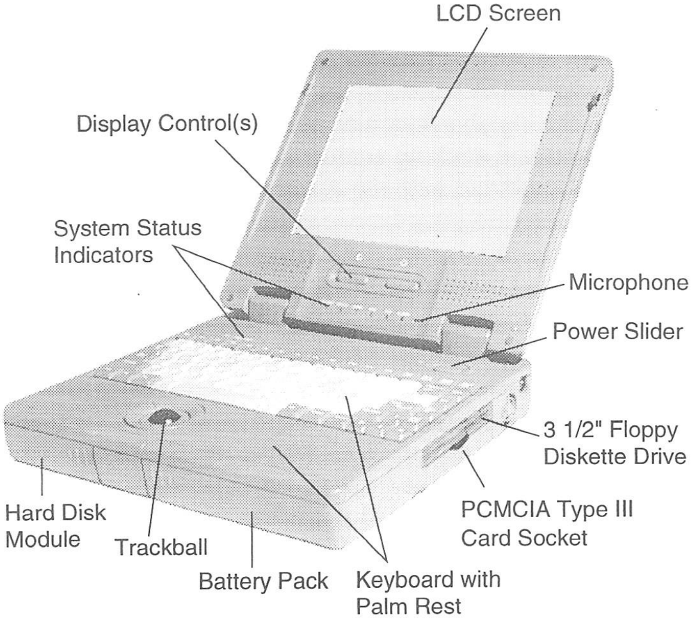


Figure 1-2 *Parts locations (part 1)*

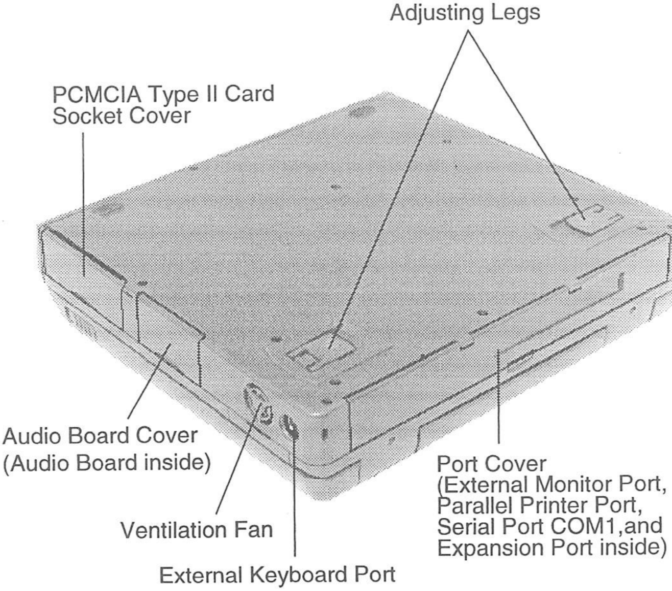

Adjusting Legs
PCMCIA Type II Card Socket Cover
Audio Board Cover (Audio Board inside)
Ventilation Fan
External Keyboard Port
Port Cover (External Monitor Port, Parallel Printer Port, Serial Port COM1,and Expansion Port inside)

Figure 1-3 *Parts locations (part 2)*

Standard Configuration

The notebook's standard configuration is briefly described in the following subsections.

Microprocessor

The brain of the 3600 is Intel's high-performance Pentium, one of the most powerful microprocessors Intel has developed for PC platforms. The 3600 system design can accommodate both 66MHz and 60MHz Pentiums. The Pentium is backward compatible with all existing x86 microprocessors while providing a superscalar, pipelined architecture, a pipelined FPU, Branch Target buffer, and two separate 8-Kbyte caches, all of which result in a significant overall performance improvement over 486 microprocessors.

Display Subsystem and Screen Technology

The 3600 comes equipped with one of the following types of VGA-compatible, CCFT-backlit LCD screens:

- ***active-matrix TFT color LCD screen.***
- ***dual-scan passive-matrix STN color LCD screen.***
- ***passive-matrix STN monochrome LCD screen.***

Built around Cirrus Logic's CL-GD6440 VGA controller, the display subsystem is capable of driving an external monitor which supports resolutions of up to 1280 x 1024, interlaced and 1024 x 768, non-interlaced. It also can provide simultaneous display to both the built-in LCD screen and the external monitor installed at 640 x 480 resolution.

Keyboard and Palm Rest

The 86-key keyboard with an embedded numeric keypad offers the same functions as an AT keyboard while featuring a special **Fn** function key which provides system-specific functions. The keyboard design incorporates a palm rest for added typing comfort.

Trackball

The 3600 features an ergonomic center-positioned trackball which can be substituted for your external mouse not only on the road but also on your desktop. It is hardware-compatible to Microsoft serial mouse and software-compatible to Microsoft Mouse Mode.

Memory and Storage Devices

The notebook comes equipped with 8MB on-board memory expandable to 16MB or 40MB. Its standard storage devices include one 2 1/2-inch, 17ms, 250MB hard disk and one 3 1/2-inch floppy diskette drives.

PCMCIA 2.01 Expansion Sockets

The notebook supports two PCMCIA 2.01-compliant expansion sockets which can accommodate credit-card sized memory, I/O, or ATA/IDE type hard disk cards. Socket 0 on the right panel can accommodate one Type III card while Socket 1 on the left panel can accept one Type II card.

Intelligent Power Management

Due to the intelligent power management technique, the notebook can "intelligently" change its CPU speed depending on whether it is in idle status or in use. The operation is completely transparent to the user and requires no external software intervention. The benefit of this implementation lies in its ability to greatly reduce power consumption and heat generation.

Setup Supported Power Saving Features

To enable on-the-road users to enjoy longer battery life, the notebook comes equipped with plenty of power saving features in addition to sporting intelligent power management. These power saving features can be easily accessed via the ROM-based setup program.

Connectivity Ports

The notebook offers ports for accommodating a serial device, a parallel device, an external monitor, an external keyboard, and the optional docking station.

System Upgradability

The 3600 is designed with strong upgradability in mind. The system is upgradable in terms of CPU, memory, hard disk, and LCD screen.

- **CPU Upgrade** *The notebook can accommodate both the 66MHz and 60MHz Pentiums. If your system currently comes with the 60MHz Pentium, you can have it upgraded with the 66MHz Pentium.*
- **Memory Upgrade** *The memory subsystem can accept up to 40MB of memory. You can upgrade your system memory to either 16MB or 40MB via an 8MB or 32MB proprietary memory module.*
- **Hard Disk Upgrade** *You can change the 250MB hard disk with another 2 1/2-inch one of higher capacity.*
- **LCD Screen Upgrade** *The notebook can support the following types of LCD screens: 9.5" TFT color, 10.3" and 9.5" dual-scan color, and 9.5" monochrome. You can have your LCD screen upgraded with a 9.5" TFT color one or something in between.*

The CPU, memory, hard disk, and LCD screen upgrade procedures are described in *3600 Service Manual*. Since CPU and LCD screen upgrade procedures involve disassembling and reassembling the notebook and changing jumper settings, and proprietary parts need to be purchased from your dealer to complete memory or hard disk upgrade procedures, please refer any upgrading job to your dealer.

2

Power Source

2

Power Source

Overview

You can operate the notebook using AC power or battery power. In this chapter, we will give you information on:

- *Where to operate the notebook.*
- *How to use AC power.*
- *How to use battery power, recharge the battery pack, and extend battery life.*

Operating Environment

Because of the notebook's ability to run on battery power and its compactness and light weight, it can be operated in your office, your home, your vehicle, or outdoors, i.e., where you feel comfortable to use the notebook.

However, just as you maintain other precision electronic appliances, you should prevent the notebook from being:

- *Exposed to excessive heat or direct sunlight.*
- *Subjected to shock or vibration.*
- *Exposed to strong magnetic fields.*
- *Left in a place where foreign matter or moisture may enter the system.*

(See **Figure 2-1**)

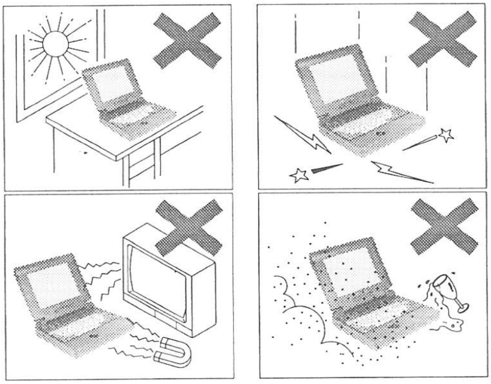


Figure 2-1 *Operation precautions*

Using AC Power

You can operate the notebook on AC power using the included AC/DC adapter and AC power cord. The AC/DC adapter is capable of autosensing voltage changes and adjusting itself accordingly. Thus, you can use the adapter in any location where power voltage falls within the range between 100 and 260 volts without having to make any adjustment manually.

Plugging in the AC/DC Adapter

The **DC/BATT** indicator will light up red to indicate the notebook is receiving power after you complete the proper plugging-in procedure by following the steps listed below. (See **Figure 2-2**)

Step 1. Plug the power cord into the adapter.

Step 2. Plug the adapter into the DC-IN socket on the right panel.

Step 3. Plug the power cord with the adapter into a properly grounded wall outlet.

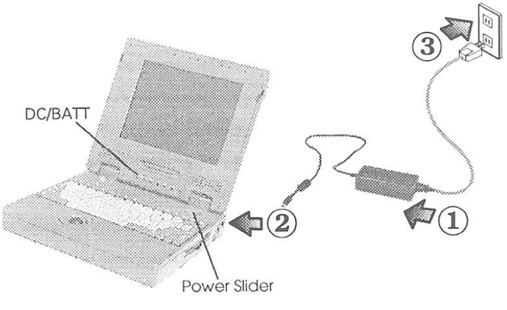


Figure 2-2 *Plugging-in procedure*

Operating the System on AC Power

After you plug in the AC/DC adapter, switch the power slider to position "1" to begin operating the notebook on AC power. (Switching the power slider to position "0" to turn the system off.)

Using Battery Power

Battery power is useful when you don't have access to AC power. The notebook can operate on both nickel metal hydride (Ni-MH) and nickel cadmium (Ni-Cd) batteries. See the label on the battery pack for information on battery type.

The following subsections will discuss what you should do before you use battery power for the first time, how to remove and reinstall the battery pack, and how to recharge the battery pack.

First Time to Use Battery Power

Although the notebook comes with a battery pack preinstalled, you should do the following before you use battery power for the first time.

- *Removing the protective mylar from the battery pack.*
  (see page 2-5)
- *Recharging the battery pack.*
  (see pages 2-8 & 2-9)

Removing the Protective Mylar

A protective mylar was placed on the side of the battery pack with two battery contacts as an insulator to prevent the battery pack from discharging electricity and protect any battery contacts from being damaged by an external vibrant force during shipment.

First remove the battery pack from the notebook (see pages 2-6 & 2-7) and then remove the protective mylar by peeling it off from the side of the battery pack with two battery contacts as shown in **Figure 2-3**.

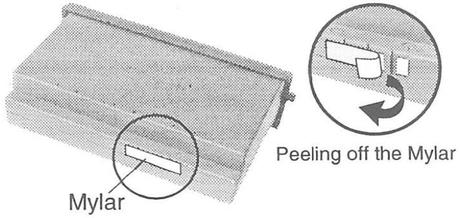


Figure 2-3 *Removing the protective mylar*

Removing the Battery Pack

To remove the battery pack, perform the following steps:

Note:
- *Before you remove or reinstall the battery pack, ensure the system is powered off and unplugged.*
- *The battery pack comes with a cover.*

Step 1. Put both thumbs on the rough surface of the battery pack cover and move the battery pack toward the right while pressing down on the rough surface. (See **Figure 2-4**)

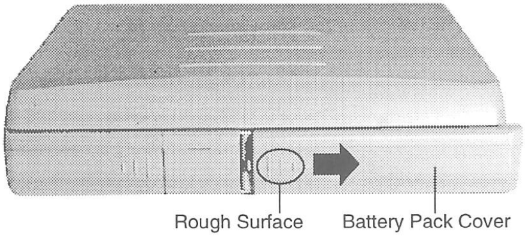


Figure 2-4 *Removing the battery pack (part 1)*

Step 2. Move the battery pack towards you and take it from its compartment. (See **Figure 2-5**)

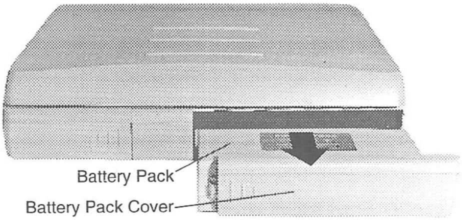


Figure 2-5 *Removing the battery pack (part 2)*

(Now the battery pack still comes with a cover.)

Step 3. Move the battery pack cover toward the direction as shown in **Figure 2-6** to separate it from the battery pack.

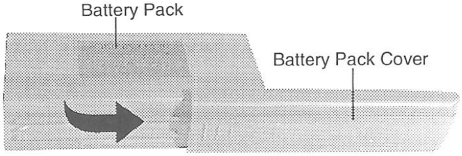


Figure 2-6 *Removing the battery pack (part 3)*

Reinstalling the Battery Pack

To reinstall the battery pack, reverse the removal procedure.

Recharging the Battery Pack

The AC/DC adapter serves double duty as the system AC power source and battery charger.

Battery Recharge Time

The AC/DC adapter will start recharging the battery pack ***when it is plugged in*** and ***the system is turned off***. The **Charge** indicator on the top cover lights up during the whole recharging process and will start flashing once the battery pack has reached full charge. ***Recharge time is about two (2) hours.***

Battery Life

The Ni-MH battery pack provides the notebook with longer operation time than the Ni-Cd battery pack. **Table 2-1** compares how much operation time you can possibly expect from the notebook when it is powered by the Ni-MH battery pack or the Ni-Cd battery pack.

Table 2-1 *Expected battery lives for the notebook when it is operated on different types of batteries*

Notebook computer	Ni-MH battery pack Battery life per charge	Ni-Cd battery pack Battery life per charge
TFT color model	2 hours	1.5 hours
Dual-scan color model	2 hours	1.5 hours
Monochrome model	2.5 hours	2 hours

In addition, Ni-MH batteries do not suffer a "memory effect" plaguing any rechargeable nickel-cadmium batteries. Thus, if you are a user of Ni-Cd battery pack, please note the following:

Important: for Users of Ni-Cd Battery Pack

Like any other rechargeable nickel-cadmium batteries used with other electronic devices, the batteries in the Ni-Cd battery pack are prone to a "memory effect", which prevents them from being completely recharged. To minimize the frequency of such problem occurring, you may take the following preventive measures:

1. *If you plan to operate the notebook on AC power for a long period of time, such as using it as a desktop replacement in the office, unplug the notebook and use up battery power from time to time if you are using the notebook with the battery pack installed.*
2. *If you need to use the notebook during a trip, use up battery power and recharge the battery pack the day before your trip.*

Battery Low Warning

When the system detects that battery power is low, the LCD screen will become dim and at the same time the battery low indicator (**BATT-LO**) will begin flashing. The remaining battery power can last about 5 to 10 minutes when the warning begins.

Extending Battery Life

You may extend your battery life by ***utilizing Setup-supported power saving features***, ***closing the display panel***, or ***slowing down the CPU speed***.

Utilizing Setup Power Saving Features

The system supports the following *Setup*-accessible power saving features: *(You may access Setup by pressing* **Delete** *during boot process.)*

LCD auto sleep setting

This feature allows the system to turn off power to the LCD screen and its backlight after it remains inactive for a preset time.

To activate the feature:

1. Enter *Setup.*
2. Set a time (1 to 20 min) for the ***LCD auto sleep setting*** field.

HDD auto sleep setting

This feature allows the system to turn off power to the hard disk motor after it remains inactive for a preset time.

To activate the feature:

1. Enter *Setup.*
2. Set a time (1 to 20 min) for the ***HDD auto sleep setting*** field.

Standby

Pressing the **Fn + Enter** key combination places the system in standby mode in which power to the LCD backlight, display subsystem and hard disk motor will be turned off.

(The section, "The Setup Program," in Chapter 4, "Operation," will give you a detailed explanation on using Setup.)

Closing the Display Panel

You may temporarily turn off power to the LCD backlight by closing the display panel.

Slowing Down the CPU Speed

The factory default setting of your CPU speed is turbo speed. To extend battery life, you may switch the CPU to low speed (20MHz). The following two key combinations can be used to change the CPU speed while the system is in operation. (Only use the following key combinations while in the DOS environment.)

Ctrl + Alt + ↑	⇨	**Turbo Speed**
Ctrl + Alt + ↓	⇨	**Low Speed**

System Description

3

System Description

Overview

The 3600 integrates the vital parts of a desktop computer system in a miniature unit. This chapter aims at helping you understand the functions the notebook can perform by giving you a detailed description of the notebook's key parts. The following topics are covered:

- *System unit external view.*
- *Memory overview.*
- *Display.*
- *Keyboard.*
- *Trackball unit.*
- *Hard disk and floppy diskette drives.*
- *PCMCIA sockets.*
- *Audio unit.*

System Unit External View

This section gives you a glance at the system unit.

Top View (Lid Closed)

In the area between the two hinges of the LCD panel are three indicators which are designed to inform the user of the system status when the notebook's lid is closed. The three indicators are described below and shown in **Figure 3-1**.

Power

Status	Meaning
on *(yellow)*	The system is receiving power. (The indicator will remain on even when the notebook's lid is closed.)

Charge

Status	Meaning
on *(green)*	The battery pack is being charged.
flashing *(green)*	The battery pack has reached full charge. ("Flashing" shows the battery full status. The indicator won't stop flashing until the AC/DC adapter is unplugged.)

Diags *(diagnostic)*

Status	Meaning
on *(red)*	Situation 1: There is no battery pack installed. Situation 2: The battery pack is not installed properly. (Reinstall the battery pack to see if the indicator will go off. If it stays on, send the battery pack to your dealer for repair.) Situation 3: The battery pack's temperature is abnormal (over 60^{o}). (Send the battery pack to your dealer for repair.)

Hard Disk Module	The hard disk module is removable and upgradable.
Battery Pack	The battery pack is rechargeable and removable.

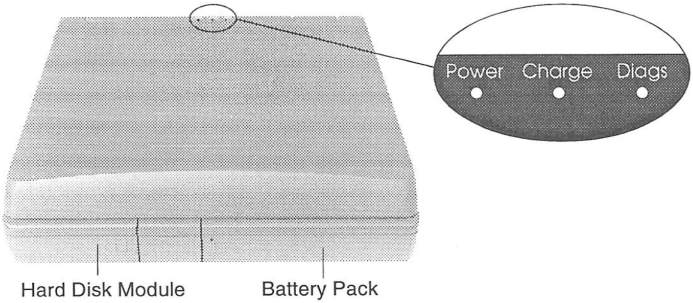


Figure 3-1 *Top view (with lid closed)*

Top View (Lid Opened)

Open the notebook's cover with catches on either side and you can see the following parts. See **Figures 3-2** & **3-3** for their locations.

On the display panel:

Speaker	It is used to output sound.
Contrast Slider	It adjusts the contrast of the LCD screen. (Note: The model with the TFT color LCD screen does not come with this slider due to its screen's excellent contrast ratio.)
Brightness Slider	It adjusts the brightness of the LCD screen.
DC/BATT	"RED" — When AC power is used. "GREEN" — When battery power is used.
BATT-LO	It begins flashing when battery power is low.
TURBO	It lights up when the system runs at turbo speed (default).
HDD	It lights up when the hard disk is being accessed.
FDD	It lights up when the floppy drive is being accessed.
IC-BUSY	It lights up when either of the installed PCMCIA cards is in operation.
Microphone	It is used to input sound.

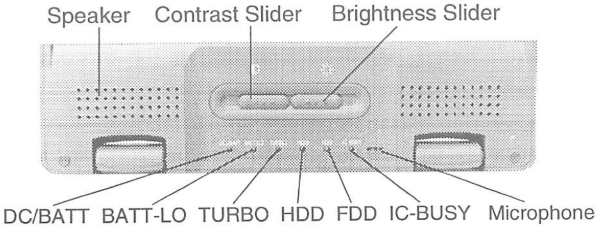


Figure 3-2 *Top View (with lid opened, part 1)*

Above the keyboard:

NUM LOCK	The NumLock indicator will light up when the embedded numeric keypad is activated.
CAPS LOCK	The indicator will light up when the internal keyboard's **CapsLock** key is pressed.
SCROLL LOCK	The indicator will light up when the internal keyboard's **ScrollLock** key is pressed.
Ventilation Area	This is where heat can flow from inside the system unit. To ensure the proper operation of the notebook, be sure to keep this area unblocked.
Power Slider	Position "1": The system is on. Position "0": The system is off.

Below the keyboard:

Trackball	It is hardware-compatible to Microsoft serial mouse and software-compatible to Microsoft Mouse mode.

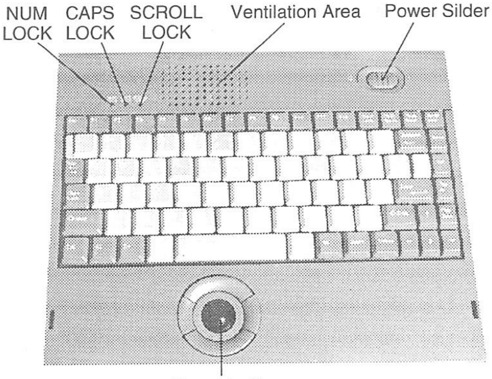


Figure 3-3 *Top View (with lid opened, part 2)*

Left View

Taking a look at the left panel, you can find the following parts. They are described below and their locations shown in **Figure 3-4**.

PCMCIA	The PCMCIA socket can accept a PCMCIA 2.01-complied, Type I/II card. (To use the socket, the socket cover should be flipped down first.)

The following three items come as part of the audio board. They are concealed in a flip-down cover.

Volume Control Knob	It is used to adjust the sound volume.
SPK-OUT	The speaker output jack is where you can plug in a speaker.
MIC-IN	The microphone input jack is where you can plug in a microphone.
Ventilation Fan	This fan helps vent heat inside the system unit. To ensure the proper operation of the notebook, be sure to keep the fan unblocked.
EXT.KB	The external keyboard port (6-pin) can accept an external IBM-compatible keyboard. If your keyboard connector is not PS/2 style (6-pin), use the included 5- to 6-pin transfer cable.

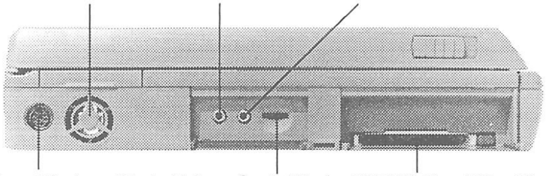


Figure 3-4 *Left view*

Right View

The following parts are located on the right panel. Their descriptions are given below and their locations shown in **Figure 3-5**.

3-1/2" Floppy Diskette Drive	This is where a 3-1/2" floppy diskette should be inserted. Press the button on its upper right side for diskette ejection.
PCMCIA	The PCMCIA socket can accept a PCMCIA 2.01-complied, Type III card. (To use the socket, the socket cover should be flipped down first.)
Ventilation Opening	This opening provides a conduit through which heat inside the system unit can dissipate. To ensure the proper operation of the notebook, be sure to keep the opening unblocked.
DC-IN	This is where the AC/DC adapter is plugged into the system.

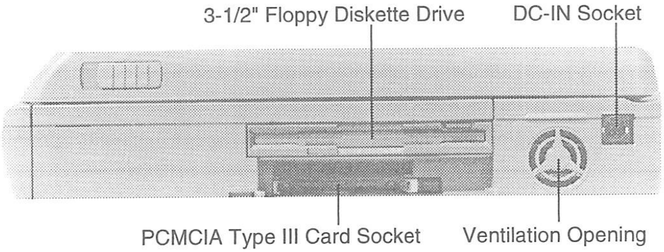


Figure 3-5 *Right view*

Rear View

The following system connectivity ports are present on the rear panel. They are described below and shown in **Figure 3-6**.

CRT	The external monitor port (15-pin) connects an external multisync monitor to the system.
PRINTER	The parallel printer port (25-pin) connects a parallel device such as a printer or a LAN adapter to the system.
COM1	The serial port COM1 (9-pin) connects a serial device to the system.

(The above three ports are concealed in a flip-down cover. To use any of them, the cover should be opened first.)

Expansion	The expansion port (200-pin) connects the optional Docking Station to the system.

(The expansion port is also hidden in the same flip-down cover. However, when you need to dock the notebook on the docking station, it is the sliding door on the cover not the whole cover should be opened.)

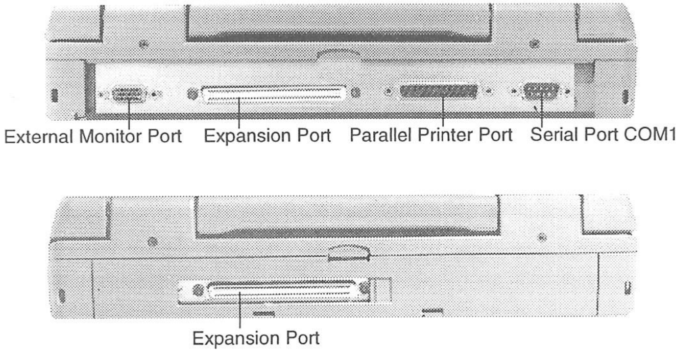


Figure 3-6 *Rear view*

Memory Overview

The notebook comes with the following kinds of memory:

- *Random Access Memory (RAM).*
- *Read Only Memory (ROM).*

RAM

The system comes with 8MB of RAM on board. It can be expanded to 16MB or 40MB via an 8MB or 32MB proprietary memory module.

Whenever you work on the notebook, program instructions and the information that your CPU is currently using off of a diskette or the hard disk is temporarily loaded into the RAM. Due to the RAM's volatile nature, information loaded into RAM will be lost if you turn off the notebook without first saving it to a diskette or the hard disk.

The first 640KB of RAM is called *conventional memory* within which DOS and DOS programs run. The 384KB after the first 640KB is *upper memory* which is reserved for system use such as ROM shadowing. (See the next subsection, "ROM," for description.) Anything beyond the first megabyte of RAM is called *extended memory*. You can take advantage of the extended memory if you are using a DOS-extended program or you have an extended memory manager such as **HIMEM.SYS** installed.

In addition, the system supports the LIM EMS 4.0 specification. This specification provides another way for operating systems and software applications to access memory (called *expanded memory*) above the 1MB limitation through implementation of a page mapping scheme that is managed by an expanded memory manager (EMM).

Only applications designed with the LIM EMS specification support can take advantage of expanded memory. One EMM you can use with the system is **EMM386.EXE** available in MS-DOS.

ROM

The system comes standard with a 128K x 8 bit ROM chip which consists of both the system, video, and PCMCIA BIOSs (Basic Input/Output System). The system board ROM subsystem starts at address hex 0E0000. The system BIOS is assigned at memory addresses betwen hex 0F0000 and hex 0FFFFF while the video & PCMCIA BIOSs at addresses from hex 0E0000 to hex 0EFFFF.

The system BIOS provides a standard way of dealing with most peripherals, including floppy and hard drives, modems and serial ports, printers, and keyboards. The video BIOS is dedicated to handling the display subsystem.

In addition, the system BIOS contains the POST, or Power-On Self Test, and the setup program. The POST is a series of diagnostic programs that check out the notebook each time it's turned on. The setup program, which can be invoked by pressing **Delete**, allows the user to configure basic system features and activate system power-saving and display features. The ROM shadowing function, one of the setup program's functions, allows the user to copy both the system and video BIOS codes to RAM. Copying the system and video BIOSs to RAM can enhance system performance because BIOS codes can be executed much faster at the RAM than the slower ROM.

The system BIOS is compatible with that in the IBM AT, as long as the programs that access the BIOS use software interrupts and do not assign absolute memory locations. Programs that refer to absolute locations in the IBM AT BIOS may not function correctly when running on the notebook.

Display

The 3600's display subsystem can drive the built-in LCD screen and an external monitor and support many display features. The 3600 is equipped with one of the following types of LCD screens:

Active-matrix TFT color LCD screen

- *9.5-inch diagonal*
- *CCFT-backlit*
- *640 x 480 pixel resolution, 256 colors*

Dual-scan passive-matrix DSTN color LCD screen

- *10.3-inch or 9.5-inch diagonal*
- *CCFT-backlit*
- *640 x 480 pixel resolution, 256 colors*

Passive-matrix STN monochrome LCD screen

- *9.5-inch diagonal*
- *CCFT-backlit*
- *640 x 480 pixel resolution, 32 shades of gray*

The screen is encased in the display panel, which can tilt back 75° past vertical.

The following subsections will briefly describe the display subsystem, its supported display features, how to use the LCD screen and an external monitor, and how to reduce the LCD screen's power consumption.

The Display Subsystem

Driven by the CL-GD6440 VGA controller, the display subsystem features:

- *VESA local bus interface to the host CPU.*
- *Internal display at a resolution of up to 640 x 480 pixels.*
- *External display at a resolution of up to 1024 x 768 pixels, non-interlaced or at a resolution of up to 1280 x 1024 pixels, interlaced.*
- *1MB video RAM, supporting 256 colors or 32 gray scales on the LCD screen and the maximum of 16,256 colors on CRT.*
- *various display features, such as SimulSCAN, simultaneous display to the notebook's LCD screen and an external monitor. (Display features will be described in more detail later.)*
- *Windows performance enhancement features.*

Display Features

The notebook supports the following LCD display features, each accessible via a specially-defined key combination (**Fn +< key>**).

Feature	Key Combination	Option	Description
Display video	Fn + F1	**Normal**	Displays characters black on white.
		Reverse	Displays characters white on black.

(This feature only applies to monochrome models.)

Expanded mode Fn + F2

Enable	Controls the vertical expansion of text mode to fill the screen as much as possible.
Disable	Deactivates the function.

(This feature only applies to the LCD screen.)

Centering Fn + F3

Center	Aligns the display area in center position.
Bottom	Aligns the display area in bottom position.
Top	Aligns the display area in top position.

(This feature only applies to the LCD screen. You only need to use this feature when "**Expanded mode**" is disabled.)

Display type Fn + F4

LCD	Displays to the LCD screen.
CRT	Displays to the external monitor installed.
SimulSCAN	Displays to both the LCD screen and the external monitor.

Status displaying Fn + Esc

Displays the current status of the above four features. (only in text mode)

Configuration saving Fn + S

Saves the current status of the first four features. When the system is booted, the last configuration saved will be used.

LCD Screen and External Monitor

The notebook is capable of driving a Super VGA monitor which supports resolutions of up to 1024 x 768, non-interlaced and 1280 x 1024, interlaced, via the external monitor port **(EXT. CRT)** on the rear panel. In addition, thanks to its SimulSCAN capability, you are able to simultaneously view both the LCD screen and an external monitor at a resolution of 640 x 480. The video utilities, available in *Video Utilities Diskettes #1 & #2*, can provide high-resolution display to an external monitor and various display features. Refer to Chapter 6, "Video Utilities," in the notebook's *Software User's Manual* for installation details. The paragraphs which follow will discuss how to change the display type and how to reduce the display power consumption.

Changing the Display Type

One of the display features mentioned on the previous page, **Display type** allows you to select the LCD screen (**LCD**), the external monitor installed (**CRT**), or both (**SimulSCAN**) as display device via the **Fn + F4** key combination.

Reducing Display Power Consumption

The LCD backlighting consumes the biggest portion of power used by the LCD screen. One of *Setup*'s supported features, ***LCD auto sleep setting*** can accept a LCD timeout value, from 1 min to 20 min. The system will turn off power to the LCD backlighting after a preset time of system inactivity. How to use this feature is described in the section, "The Setup Program," in Chapter 4, "Operation."

The Keyboard

The keyboard, built with 86 keys, is AT-compatible. The keys belong to either of the key groups: *light-colored keys* and *dark-colored keys*.

> **Light-Colored Keys** *The light-color keys function in the same way as their counterparts on a regular typewriter.*
>
> **Dark-Colored Keys** *The dark-colored keys are used to control the cursor, provide special functions defined by different software, and perform system-specific functions.*

In addition, it features ***an embedded numeric keypad*** and ***a special function key*****—Fn**. The US English layout of the keyboard is shown in **Figure 3-7**.

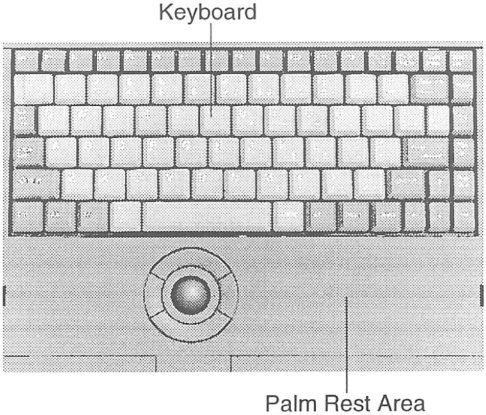


Figure 3-7 *Keyboard*

Embedded Numeric Keypad

A special numeric keypad, clearly labelled in blue, is embedded in the keyboard as shown in **Figure 3-8**.

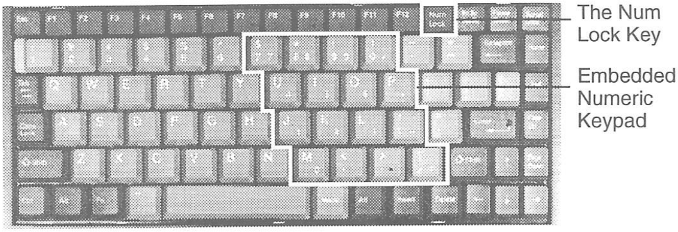


Figure 3-8 *The embedded keypad*

NumLock Key — Toggling the Keypad on/off

You can activate or deactivate the embedded numeric keypad by pressing the **NumLock** key. The key's status indicator **(NUM LOCK)** is "on" or "off" to indicate the keypad is "activated" or "deactivated".

Keypad Function

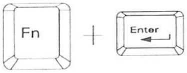
The keypad is functionally compatible with the numeric mode of an IBM keypad or its compatible.

Note: • *Some software allow you to use number keys in conjunction with the* **Alt** *key to produce special characters. Please note that this kind of special characters can only be produced by using number keys on the embedded keypad rather than regular number keys.*

Fn — System Specific Function Key

The **Fn** key, located at the left bottom corner of the keyboard, is designed to be used with seven embedded keys to provide six display features (see pages 3-12 & 13) and the following system power-saving feature:

Standby Feature



Places the system in Standby. When the system is in Standby, power to the LCD backlight, display subsystem, and hard disk motor will be turned off.

To resume normal operation, press any other key except **Fn**.

Important:

- *By factory default, the* **Fn** *key is set* "**Enabled**". *It is important that the* **Fn** *key should be disabled before you install and when you run either OS/2 or Windows NT. (See the section, "The Setup Program," in Chapter 4, "Operation," for information on disabling the* **Fn** *key.)*

Internal and External Keyboards

An external IBM compatible keyboard can be connected to the notebook through the external keyboard port **(EXT.KB)** on the left panel. If you want to use an external keyboard with the notebook, there are two points you should know.

Use the included 5- to 6-Pin PS/2-Style Transfer Cable if your keyboard comes with a 5-pin connector. The notebook's external keyboard port **(EXT.KB)** is PS/2 style (6-pin). If your keyboard comes with a 5-pin, non-PS/2-style cable connector, use the included 5- to 6-pin keyboard transfer cable.

An external keyboard has higher priority than the internal keyboard. You can not activate both an external keyboard and the internal keyboard at one time. The *keyboard autodetect feature* will check the presence of an external keyboard. If an external keyboard is installed, it will be activated instead of the internal keyboard. The internal keyboard will be activated if there is no external keyboard installed.

The Trackball

The built-in trackball, positioned below the keyboard, offers all the same functions as an external mouse, making a convenient mouse substitute while you are on the go.

Describing the Trackball

The trackball is hardware-compatible with the Microsoft serial mouse and software-compatible with the Microsoft mouse mode. As illustrated in **Figure 3-9**, the whole trackball unit consists of three working parts: *one trackball* and *two trackball buttons.*

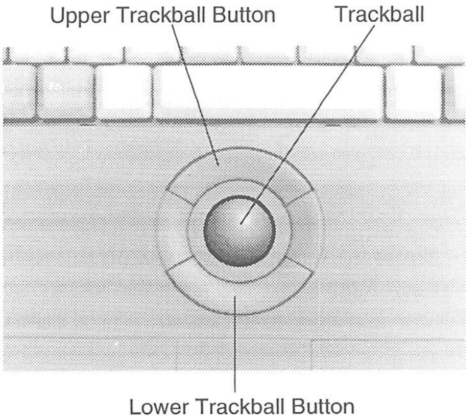


Figure 3-9 *The trackball*

The following list compares the trackball unit with the Microsoft serial mouse.

Trackball Part	Equivalent Mouse Part
trackball	mouse ball
upper trackball button	left mouse button
lower trackball button	right mouse button

Enabling and Configuring the Trackball

Like an external mouse or any other pointing device, the trackball must be enabled and configured to be able to work with your software.

Enabling the trackball. To enable the trackball is to electronically connect it to the system. The trackball can be set as "**Enabled**", ***which is the factory default setting*** or "**Disabled**" via the setup program. (See the section, "The Setup Program," in Chapter 4, "Operation," for description.)

Configuring the trackball. The notebook comes with *GMOUSE Software* for configuring the trackball for both the DOS and Windows environments. Refer to Chapter 3, "GMOUSE Software", in the notebook's *Software User's Manual* for information on how to install *GMOUSE Software* and how to use other related utilities.

MS-DOS's mouse driver, **MOUSE.COM**, can also be used to configure the trackball for use in the DOS environment. Since the trackball is electronically ***connected to serial port COM2***, you should ***add the parameter "2" to your command*** (i.e., MOUSE 2) when you want to activate the trackball with the **MOUSE.COM** mouse driver.

Disk Drives

The system comes equipped with one 250MB 2 1/2" 17ms hard disk drive and one 3 1/2" 1.4MB floppy diskette drive.

Hard Disk Module

The notebook's hard disk comes in plastic casing. The module is designed to be removable and upgradeable. The following subsections will describe how to prepare the hard disk for optimal use and how to upgrade/replace the hard disk module.

Preparing the Hard Disk for Optimal Use

The notebook's hard disk is IDE type. The VESA local bus IDE interface has been implemented in the system design to enhance the hard disk performance. To be able to use the hard disk and optimize its performance, you need to format it and configure the IDE hard disk controller with *APPIAN ADI2 Tool Set.*

Formatting the Hard Disk

A hard disk must be pre-formatted, partitioned, and formatted before use. Use the MS-DOS **fdisk** command to pre-format and partition the hard disk. To format the hard disk, use the MS-DOS **format** command. To make it bootable, use the **format/s** command. See MS-DOS user's manual for information on using the **fdisk**, **format**, and **format /s** commands.

Configuring the IDE Hard Disk Controller

To take full advantage of the VESA local bus IDE interface to optimize the hard disk performance, the IDE hard disk controller should be configured using *APPIAN ADI2 Tool Set*. Chapter 1, "APPIAN ADI2 Tool Set," in the notebook's *Software User's Manual* will teach you how to configure your IDE hard disk controller with *APPIAN ADI2 Tool Set.*

Replacing/Upgrading the Hard Disk Module

Replacing the hard disk module involves the same procedures as upgrading the hard disk module. They are:

- *Removing the hard disk module.*
- *Installing the new hard disk module.*
- *Configuring the new hard disk via Setup.*
- *Configuring the IDE hard disk controller with APPIAN ADI2 Tool Set. (Refer to the notebook's Software User's Manual.)*

☞ **Note:** • *When you need to purchase a new hard disk of the same or higher capacity, contact your dealer.*

Removing the Hard Disk Module

To remove the hard disk, perform the following steps:

Step 1. Put both thumbs on the rough surface of the hard disk module cover and move the hard disk module toward the left while pressing down on the rough surface. (See **Figure 3-10**)

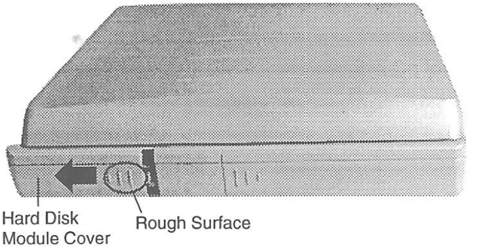


Figure 3-10 *Hard disk module removal (part 1)*

Step 2. Move the hard disk module towards you and take it from its compartment. (See **Figure 3-11**)

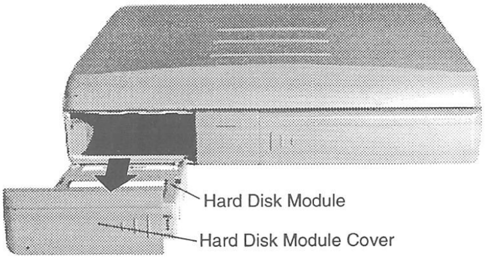


Figure 3-11 *Hard disk module removal (part 2)*

(Now the hard disk module still comes with a cover.)

Step 3. Move the hard disk module cover toward the direction as shown in **Figure 3-12** to separate it from the hard disk module.

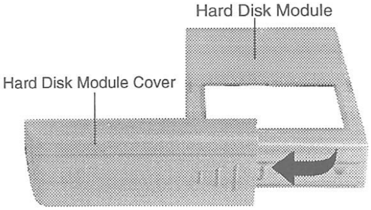


Figure 3-12 *Hard disk module removal (part 3)*

Installing the New Hard Disk Module

To install the (new) hard disk module, reverse the removal procedure.

Configuring the New Hard Disk via Setup

After you install the new hard disk module, you must configure the hard disk via *Setup*. To configure it, do the following:

1. Prepare the disk specifications (For disk specifications refer to the information printed on the hard disk label or the instructions sheet provided with the disk.)
2. Enter *Setup* by pressing **Delete** during boot process.
3. In *Setup*'s ***Hard Disk C*** field, enter the disk specifications. (**Type 47** is user-definable.)

☞ **Note:** • *If the disk specifications are not available, you can get the information using Setup's **Auto Detect Hard Disk** feature. Be sure to take note of the detected parameters on the label on your hard disk casing. Use the same parameters to reconfigure the hard disk when you need to reinstall it in the notebook. Using a different set of parameters to reconfigure the same hard disk may lead to the hard disk's inability to work.*

Refer to the section, "The Setup Program", in Chapter 4, "Operation," for a detailed description of how to use *Setup*.

Floppy Diskette Drive and Diskettes

Inserting/Removing Flexible Diskettes

- Handle a floppy diskette by its edges.
- With the label side up, gently insert a diskette into your drive until the diskette is properly seated.
- Press the drive button on the right side for diskette ejection.

Write-Protecting Diskettes

A diskette can be write-protected to prevent the files from being destroyed accidentally. To write-protect a diskette, you may switch the built-in write-protect tab to the write-protect position. When you want to write data onto a write-protected diskette, be sure to put its write protect tab back to the write enable position, thus switching the diskette to the normal status.

Do's and Don'ts

- Always make backup copies of your software diskettes and data diskettes.
- Be sure to write on your diskette labels with a soft-tip pen. A pencil or ballpoint pen can damage your diskettes if you press too hard.
- Do not remove any diskette from the drive when the FDD in-use indicator **(FDD)** is on.
- Do not touch or scratch the exposed portion, the head aperture of a diskette, or allow dust or moisture to collect on a diskette.
- Do not clean, bend or throw your diskettes.
- Store diskettes in a safe place, away from magnetism and extreme temperatures.

PCMCIA Sockets

The notebook comes with the following two PCMCIA 2.01-complied sockets:

Socket 0 (on the right side)

*The socket can accommodate a PCMCIA **Type I, II,** or **III** card.*

Socket 1 (on the left side)

*The socket can accommodate a PCMCIA **Type I** or **II** card.*

Inserting and Removing a Card

Like inserting and removing a floppy diskette, you can insert and remove a PCMCIA card no matter whether the system is on or off.

Inserting a PCMCIA card

Insert a card into the socket until it locks in place. The system will beep once if you have successfully inserted a card into the socket. **Figure 3-13** shows one PCMCIA Type III card and one PCMCIA Type II card are separately being inserted into socket 0 and socket 1.

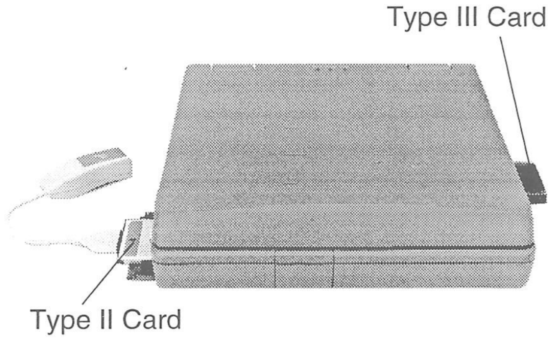


Figure 3-13 *Inserting a PCMCIA card*

Removing a PCMCIA card

Press the ejection button to remove the card and you will hear two beep sounds.

☞ **Note:** • *Any I/O card should be removed before you warm-start the notebook.*

The Audio Unit

The audio unit provides the notebook with audio capability. The notebook, combined with the audio unit and the optional Docking Station with a CD-ROM drive installed, makes a miniature multimedia system. The audio unit is hardware compatible with ADLIB and Sound Blaster[1] and software compatible with Microsoft Windows Sound System. The unit includes the following items:

Hardware: (Figure 3-14)

- *Mono audio board with volume control knob, speaker output jack, and microphone input jack.*
- *Built-in speaker.*
- *Built-in microphone.*

Software:

- *Audio utilities in two diskettes (driver and audio applications)*

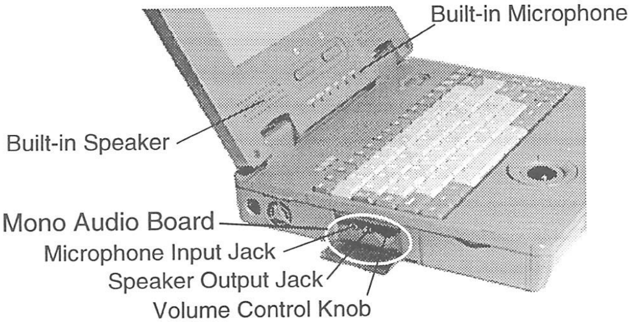


Figure 3-14 *Audio unit (hardware)*

Using the Audio Board

By factory default, the board is hardware-configured at I/O address port 240, interrupt request channel 2 or 9 and DMA channel 1. Before you can use the board, you have to activate it first by configuring it with the included audio driver. The audio utilities which come in two diskettes include the audio driver and various audio applications. See Chapter 5, Audio Utilities, in the notebook's *Software User's Manual* for installation information.

The speaker output jack (SPK-OUT) can accept an external mono speaker. It is recommended that the impedance of your speaker is 8 ohm. The internal speaker will be disabled once you plug in an external speaker.

The microphone input jack (MIC-IN) can accept an external microphone. The internal microphone will be disabled once you plug in an external microphone.

The volume control knob can be used to turn the volume up or down.

Note 1

Sound Blaster Compatible: compatible with Sound Blaster^{TM} version 2.01 voice I/O functions as documented in the Sound Blaster Series Developer Kit (except 44KHz playback).

Operation

4

Operation

Overview

This chapter provides you with the basics of operating the notebook. It begins with a description of the system startup procedures and then describes what the Power-On-Self-Test (POST) does. It concludes with a detailed discussion of the user-accessible setup program (*Setup*) for setting or altering system configuration parameters.

System Startup

You can choose to start your system from a PCMCIA card, a floppy diskette, or your hard disk. The prerequisite to booting from any of the three devices is that they should be bootable. The following subsections will describe how to make your hard disk bootable, the system's booting priority orders, and how to restart your system. (**Note:** How to make a bootable PCMCIA card is described in the notebook's *Software User's Manual.* SRAM cards and series II flash cards are the kinds of PCMCIA cards which can be used as bootable devices.)

Making the Hard Disk Bootable

To format a hard disk and make it bootable, please perform the following steps:

1. Insert in drive A a licensed MS-DOS diskette (version 3.3 or higher.
2. Start the system.

   If the hard disk **has been formatted**, perform **steps A and C**.

   If the hard disk **has not been formatted**, perform **steps B and C**.

   A. Copy system hidden files in the diskette to the hard disk using the **sys c:** command. Transfer the **COMMAND.COM** file to the root directory of your hard disk using the **copy** command.

   B. At the MS-DOS prompt "A:>," type "**format c: /s**" then press **Enter**.

   C. Eject the diskette in drive A and restart the system. The system should boot from drive C.

Booting Priority Orders

Setup, a ROM-based program, allows you to choose between the following two booting priority orders by changing its ***PCMCIA Boot Function*** field's setting. (*Setup* can be accessed by pressing the **Delete** key during boot process. See the section, "The Setup Program," in this chapter for details.)

Priority Order I

The ***PCMCIA Boot Function***'s default setting is "**Disabled**," and the system's booting priority order is:

1. floppy diskette — **2.** hard disk

On each power-on, one of the following situations will take place:

If	Then
A bootable diskette is in drive A	the system will boot from drive A.
No diskette is in drive A and drive C is bootable	the system will boot from drive C.
An unbootable diskette is in drive A or No diskette is in drive A and drive C is not bootable	the system won't boot and will display a booting error message on the screen.

Priority Order II

When *PCMCIA Boot Function* is set "**Enabled**," the booting priority order is:

1. PCMCIA memory card — **2.** floppy diskette — **3.** hard disk

On each power-on, one of the following situations will take place:

If	**Then**
A bootable card is in socket 0	the system will boot from socket 0. Note: It is only socket 0 (on the right side) that has booting capability.
No card is in socket 0 and a bootable diskette is in drive A	the system will boot from drive A.
No card is in socket 0, no diskette in drive A, and drive C is bootable	the system will boot from drive C.
An unbootable card is in socket 0 or No card is in socket 0 and an unbootable diskette is in drive A or No card is in socket 0, no diskette is in drive A, and drive C is not bootable.	the system won't boot and will display a booting error message on the screen.

Restarting the System

The system can be restarted by either:

Warm Boot

Press **Ctrl** + **Alt** + **Del** keys simultaneously.

Cold Boot

If the warm boot fails, turn off the system, wait a few seconds, and then turn the system back on.

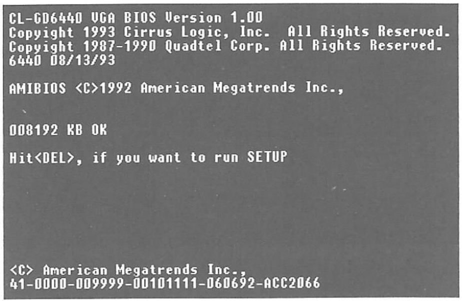
Power-On Self Test (POST)

Each time the system is turned on, it will automatically perform a 3 to 15 seconds Power-On Self Test (POST). The POST tests and initializes the hardware components that make up the entire computer system. Devices such as the microprocessor, keyboard, disk drives, display subsystem, memory subsystem, and all other key subsystems are checked out for correct operating capability.

The system will display different screen messages to indicate whether the system passed or failed the POST.

Passing the POST

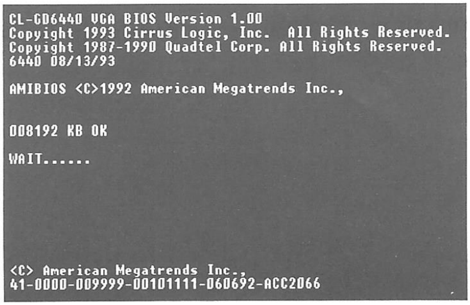
If no configuration errors have been detected, the system will beep once and display a screen message similar to **Figure 4-1**.



```
CL-GD6440 VGA BIOS Version 1.00
Copyight 1993 Cirrus Logic, Inc.  All Rights Reserved.
Copyight 1987-1990 Quadtel Corp. All Rights Reserved.
6440 08/13/93

AMIBIOS <C>1992 American Megatrends Inc.,


008192 KB OK

Hit<DEL>, if you want to run SETUP





<C> American Megatrends Inc.,
41-0000-009999-00101111-060692-ACC2066
```

Figure 4-1 *POST screen (one)*

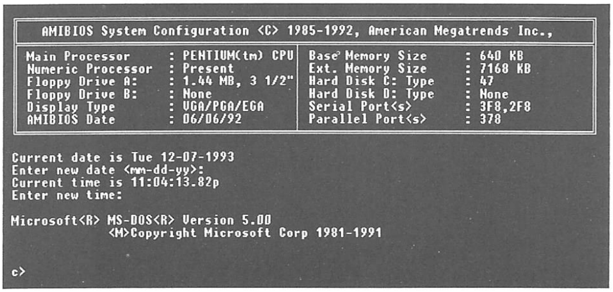
At this time, press the **Delete** key if you want to enter *Setup*; otherwise, a screen message similar to **Figure 4-2** will appear:



```
CL-GD6440 VGA BIOS Version 1.00
Copyight 1993 Cirrus Logic, Inc.  All Rights Reserved.
Copyight 1987-1990 Quadtel Corp. All Rights Reserved.
6440 08/13/93

AMIBIOS <C>1992 American Megatrends Inc.,


008192 KB OK

WAIT......





<C> American Megatrends Inc.,
41-0000-009999-00101111-060692-ACC2066
```

Figure 4-2 *POST screen (two)*

Then, the system will attempt to boot. Another message similar to **Figure 4-3** will be displayed after the system completes the boot process.



```
   AMIBIOS System Configuration <C> 1985-1992, American Megatrends Inc.,

 Main Processor      : PENTIUM(tm) CPU  Base Memory Size     : 640 KB
 Numeric Processor   : Present          Ext. Memory Size     : 7168 KB
 Floppy Drive A:     : 1.44 MB, 3 1/2"  Hard Disk C: Type    : 47
 Floppy Drive B:     : None             Hard Disk D: Type    : None
 Display Type        : VGA/PGA/EGA      Serial Port<s>       : 3F8,2F8
 AMIBIOS Date        : 06/06/92         Parallel Port<s>     : 378

Current date is Tue 12-07-1993
Enter new date <mm-dd-yy>:
Current time is 11:04:13.82p
Enter new time:

Microsoft<R> MS-DOS<R> Version 5.00
             <M>Copyright Microsoft Corp 1981-1991


c>
```

Figure 4-3 *Passing the POST*

Press **Enter** twice if you do not need to change the date and time.

The date and time can either be changed here at the system level or in *Setup*. All necessary data files will reflect the changes made at either place. Perform a warm boot to initiate another POST routine if necessary.

Failing the POST

Errors can occur during POST, which is performed every time the system is turned on. Fatal errors (**Table 4-1**), non-fatal errors (**Table 4-2**), and ISA NMI errors (**Table 4-3**) are communicated through a series of audible beeps and/or screen messages.

Fatal Error Messages

All errors listed in the following table except Beep Code 8 are fatal errors. Fatal errors do not allow the system to continue the boot process.

Table 4-1 *POST fatal error messages*

Beeps	**Error Message**	**Description**
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity error in the first 64 KB of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
5	Processor error	The CPU on the motherboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.

Table 4-1 *POST fatal error messages (continued)*

Beeps	Error Message	Description
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.

The system halts after any of the following screen messages and cannot usually be rebooted until a physical change is made in the system.

- *CMOS inoperational*
- *DMA error*
- *DMA #2 error*
- *HDD Controller failure*
- *INTR #2 error*
- *On Board Parity error*
- *8042 - Gate A20 error*
- *DMA #1 error*
- *FDD Controller failure*
- *INTR #1 error*

Non-Fatal Error Messages

The **F1** prompt message will not be displayed if the ***Wait for <F1> If Any Error*** field in the *Advanced CMOS Setup* sub-menu has been "**Disabled.**" For most errors there will be only one message displayed. However, a second message may appear: **RUN SETUP.**

If the following message occurs, press **F1** to run *Setup*.

Table 4-2 *POST non-fatal error messages*

Error Message	Explanation
8042 - Gate A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
C:Drive Error	Hard disk drive C: does not respond. Run the Hard Disk Utility to correct this problem. Also, check the C: hard disk type in *Standard CMOS Setup* to make sure that the hard disk drive type is correct.
C:Drive Failure	Hard disk drive C: does not respond. Replace the hard disk drive.
CH-2 Timer Error	Most AT systems include two timers. There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run *Setup*.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run *Setup*.

Table 4-2 *POST non-fatal error messages (continued)*

Error Message	Explanation
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run *Setup*.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run *Setup*.
CMOS Time and Date Not Set	Run *Standard CMOS Setup* to set the date and time in CMOS RAM.
Diskette Boot Failure	The boot diskette in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot diskette and follow the screen instructions.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
FDD Controller Failure	The BIOS cannot communicate with the floppy diskette drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the diskette in floppy drive A:, but cannot boot the system. Use another boot diskette.

Table 4-2 *POST non-fatal error messages (continued)*

Error Message	Explanation
Keyboard Error	There is a timing problem with the keyboard. Set the **Keyboard** option in *Standard CMOS Setup* to **Not Installed** to skip the keyboard POST routines.
KB/Interface Error	Cannot find a bootable sector on either diskette drive A: or hard disk drive C:. The BIOS calls INT 18th which generates this message. Use a bootable diskette.

ISA Error Messages

Table 4-3 lists and explains POST ISA error messages.

Table 4-3 *POST EISA error messages*

Error Message	Explanation
Memory Parity Error At xxxx	Memory failed. If the memory location can be determined, it is displayed as xxxx. If not, the message is **Memory Parity Error ????**.
I/O Card Parity Error at xxxx	An expansion card failed. If the address can be determined, it is displayed as xxxx. If not, the message is **I/O Card Parity Error ????**.
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

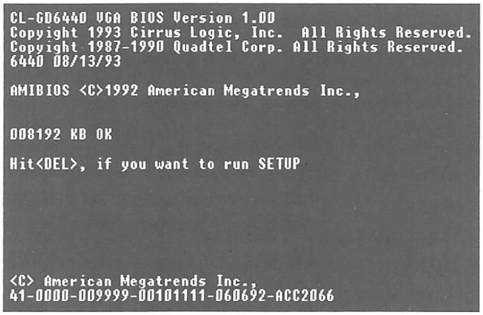
The Setup Program

Setup, a ROM-based program, is for configuring the system's basic features and activating various power-saving and display features.

Entering, exiting, changing fields within each sub-menu and setting defaults within each field are described in the following sections.

Entering Setup

To enter *Setup*, press the **Delete** key during the system boot (immediately after turning on the system) when a screen message similar to **Figure 4-4** appears:



```
CL-GD6440 VGA BIOS Version 1.00
Copyight 1993 Cirrus Logic, Inc.  All Rights Reserved.
Copyight 1987-1990 Quadtel Corp. All Rights Reserved.
6440 08/13/93

AMIBIOS <C>1992 American Megatrends Inc.,


008192 KB OK

Hit<DEL>, if you want to run SETUP






<C> American Megatrends Inc.,
41-0000-009999-00101111-060692-ACC2066
```

Figure 4-4 *Entering the setup program*

Once the **Delete** key is pressed, *Setup*'s main menu will appear. (Refer to **Figure 4-5** on page 4-19 for a sample display of the main menu.)

Exiting Setup

The changes made in *Setup* either can be saved or canceled before exiting *Setup*.

Exit Setup without saving changes

At the *Setup*'s main menu, press **Esc** then either:

- press "Y" and **Enter** to exit without saving any changes.

or

- press "N" and **Enter** to remain in *Setup* with no changes saved.

Exit Setup with changed saved

At the *Setup*'s main menu, press **F10** then either:

- press "Y" and **Enter** to save the changes and exit *Setup*.

or

- press "N" and **Enter** to remain in *Setup* with no changes saved.

Setup Keys

The keys used for entering, exiting *Setup* and modifying values within the sub-menus and fields are described in **Tables 4-4** to **4-6**.

Table 4-4 *Keys used with Setup's main menu.*

Function	Keys	Description
Enter *Setup*	**Delete**	Press the **Delete** key during system boot to enter *Setup*.
Enter sub-menus	1. ↑↓→← 2. **Enter**	Use the **up/down/left/ right arrows** to move the highlighted bar to the desired sub-menu and press **Enter**.
Change color (gray scale)	**F2 or F3**	Use **F2** or **F3** to alter the display color/gray scale.
Save modification(s) and exit *Setup*	**F10**	At the main menu, use **F10** to save the changes and exit *Setup*.
Quit *Setup* without saving modification(s).	**Esc**	At the main menu, use **Esc** to quit *Setup* without saving the modifications.

Table 4-5 *Keys used with Setup's sub-menus*

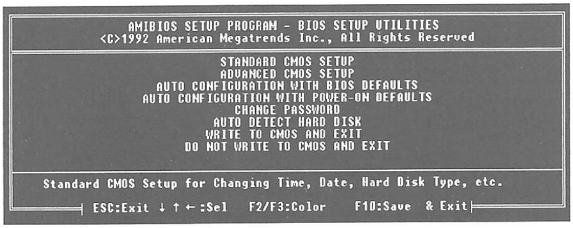
Function	Keys	Description
Enter sub-menus	1. ↑↓→← 2. **Enter**	Use the **Up/Down/Left/ Right Arrows** to move the highlighted bar to the desired sub-menu and press **Enter**.
Select fields	↑↓→←	Use the **Up/Down/Left/ Right Arrows** to move the highlighted bar to the desired field.
Change field values	**Page Up/ Page Down**	Use **Page Up/Page Down** to change field values.
Change color (gray scale)	**F2** or **F3**	Use **F2** or **F3** to alter the display color/gray scale.
Exit screens	**Esc**	Once the desired values have been changed, press **Esc** to exit each screen.

Table 4-6 *Keys used with Setup's Advanced CMOS Setup sub-menu*

Function	Keys	Description
Enter sub-menus	**1. ↑↓→←** **2. Enter**	Use the **Up/Down/Left/ Right Arrows** to move the highlighted bar to the desired sub-menu and press **Enter**.
Select fields	**↑↓→←**	Use the **Up/Down/Left/ Right Arrows** to move the highlighted bar to the desired field.
Change field values	**(Ctrl +)** **Page Up/Page Down**	Use (**Control** +) **Page Up/Page Down** to change field values.
Help menu	**F1**	Move the highlight bar to the desired field and press **F1** for a brief explanation of the subject.
Change color (gray scale)	**F2** or **F3**	Use **F2** or **F3** to alter the display color/gray scale.
Retrieve old/ previous values	**F5**	Use **F5** to load the previous default settings (before saving).
Retrieve BIOS Setup Defaults	**F6**	Use **F6** to load the BIOS Setup Defaults.
Retrieve Power-On Defaults	**F7**	Use **F7** to load the Power-On Defaults.
Exit screens	**Esc**	Once the desired values have been changed, press **Esc** to exit each screen.

The Setup Menu

Once you enter *Setup*, a screen with eight (8) sub-menus/selections will be displayed as shown in **Figure 4-5**.



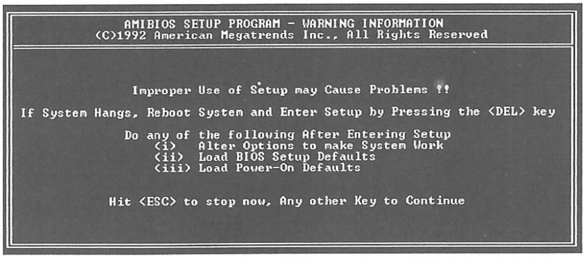
```
AMIBIOS SETUP PROGRAM - BIOS SETUP UTILITIES
<C>1992 American Megatrends Inc., All Rights Reserved

STANDARD CMOS SETUP
ADVANCED CMOS SETUP
AUTO CONFIGURATION WITH BIOS DEFAULTS
AUTO CONFIGURATION WITH POWER-ON DEFAULTS
CHANGE PASSWORD
AUTO DETECT HARD DISK
WRITE TO CMOS AND EXIT
DO NOT WRITE TO CMOS AND EXIT

Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.
ESC:Exit ↓ ↑ ← :Sel   F2/F3:Color    F10:Save  & Exit
```

Figure 4-5 *Setup's main menu*

Use the **Up & Down Arrow** keys to move the highlight bar through the selections and press **Enter** to enter the desired sub-menu. Refer to **Tables 4-4** to **4-6** for a detailed listing.

Standard CMOS Setup

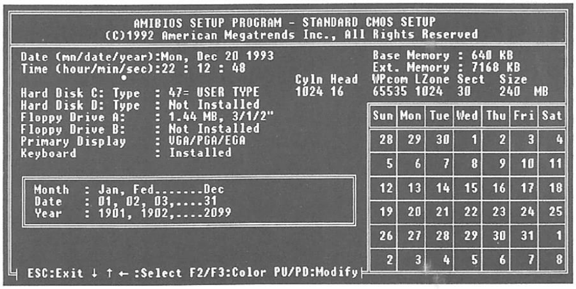
Upon entering the *Standard CMOS Setup*, a screen similar to **Figure 4-6** will appear. At this point, press **Esc** to return to the previous menu or **press any other key to continue**.



```
          AMIBIOS SETUP PROGRAM - WARNING INFORMATION
      (C)1992 American Megatrends Inc., All Rights Reserved

              Improper Use of Setup may Cause Problems !!

 If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

             Do any of the following After Entering Setup
                 (i)   Alter Options to make System Work
                 (ii)  Load BIOS Setup Defaults
                 (iii) Load Power-On Defaults

           Hit <ESC> to stop now, Any other Key to Continue
```

Figure 4-6 *Entering the Standard CMOS Setup*

There are ten (10) fields available in the *Standard CMOS Setup* as shown in **Figure 4-7**. Pages 4-21 to 4-23 provide a brief description of each field's function.



```
          AMIBIOS SETUP PROGRAM - STANDARD CMOS SETUP
      (C)1992 American Megatrends Inc., All Rights Reserved
Date (mn/date/year):Mon, Dec 20 1993           Base Memory : 640 KB
Time (hour/min/sec):22 : 12 : 48               Ext. Memory : 7168 KB
                                     Cyln Head  WPcom LZone Sect  Size
Hard Disk C: Type   : 47= USER TYPE  1024 16    65535 1024  30    240  MB
Hard Disk D: Type   : Not Installed
Floppy Drive A:     : 1.44 MB, 3/1/2"         Sun Mon Tue Wed Thu Fri Sat
Floppy Drive B:     : Not Installed            28  29  30   1   2   3   4
Primary Display     : VGA/PGA/EGA               5   6   7   8   9  10  11
Keyboard            : Installed                12  13  14  15  16  17  18
                                               19  20  21  22  23  24  25
  Month  : Jan, Fed.......Dec                  26  27  28  29  30  31   1
  Date   : 01, 02, 03,....31                    2   3   4   5   6   7   8
  Year   : 1901, 1902,....2099

 ESC:Exit ↓ ↑ ← :Select F2/F3:Color PU/PD:Modify
```

Figure 4-7 *The Standard CMOS Setup*

1. Date (mn/date/year)

The system's internal calendar setting: days of the week, month, date, and year. The date block in the calendar will flash to reflect the **Date** setting.

days of the week	changes automatically according to the changes made in month, date, or year
mm	the month from Jan. to Dec.
dd	the date from 1 to 31
yy	the year from 1901 to 2099

2. Time (hour/min/sec)

The system's time tracking setting: hour, minute, and second.

hh	the hour from 00 to 23 (i.e., 00 = mid night; 13 = 1 p.m.)
mm	the minute from 00 to 59
ss	the second from 00 to 59.

The date and time can either be changed in *Setup* or at the system level. The system will alter the changes made at either place to all necessary data files.

3. Hard Disk C

This field lists the configuration information for the hard disk installed in the notebook. Use the ***Auto Detect Hard Disk*** feature in the main *Setup* menu for the hard disk's type and auto configuration (see page 4-33).

4. Hard Disk D

If installed, this field stores the configuration information for hard disk D (similar to listing for ***Hard Disk C***).

5. Floppy Drive A

Although the system comes with a floppy drive A that requires either the 720K or the 1.4MB (3.5-inch) disk configuration, the system is capable of supporting all of the configuration types listed below:

Not Installed	no floppy drive A installed
360 KB, 5 1/4"	5 1/4" double-sided, **double-density** drive; 360 kilobyte capacity
1.2 MB, 5 1/4"	5 1/4" double-sided, **high-density** drive; 1.2 megabyte capacity
720KB, 3 1/2"	3 1/2" double-sided, **double-density** drive; 720 kilobyte capacity
1.4MB, 3 1/2"	3 1/2" double-sided, **high-desnity** drive; 1.44 megabyte capacity
2.88MB, 3 1/2"	3 1/2" double-sided, **high-density** drive; 2.88 megabyte capacity

6. Floppy Drive B

If installed, this field stores the configuration information for floppy drive B (refer to ***Floppy Drive A***'s configuration type listing on previous page).

7. Primary Display

Setting for the primary video adapter's setting. (For the 3600, the setting should be **VGA/PGA/EGA** even for the monochrome model.)

8. Keyboard

To test the keyboard during the system boot, select **Installed** (with or without an external keyboard); otherwise, select **Not Installed**.

9. Base Memory

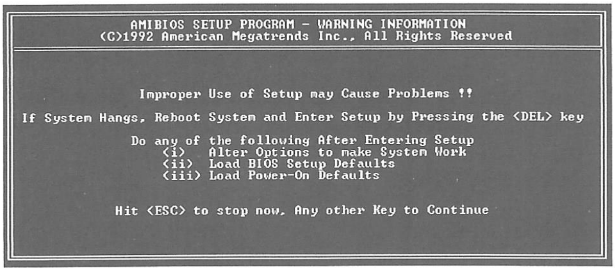
This field lists the based memory installed and detected by the system. (This setting cannot be altered by the user.)

10. Ext. (Extended) Memory

This field lists the extended memory installed and detected by the system. (This setting cannot be altered by the user.)

Advanced CMOS Setup

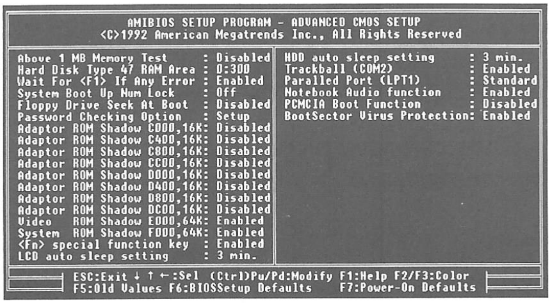
Upon entering the *Advanced CMOS Setup*, a screen similar to **Figure 4-8** will appear. At this point, press **Esc** to return to the previous menu or **press any other key to continue**.



```
           AMIBIOS SETUP PROGRAM - WARNING INFORMATION
        <C>1992 American Megatrends Inc., All Rights Reserved

             Improper Use of Setup may Cause Problems !!

If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key

              Do any of the following After Entering Setup
                 <i>   Alter Options to make System Work
                 <ii>  Load BIOS Setup Defaults
                 <iii> Load Power-On Defaults

           Hit <ESC> to stop now. Any other Key to Continue
```

Figure 4-8 *Entering the Advanced CMOS Setup*

There are twenty-four (24) fields available in the *Advanced CMOS Setup* as shown in **Figure 4-9**. Pages 4-25 to 4-30 provide a brief description of each field's function.



```
              AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
           <C>1992 American Megatrends Inc., All Rights Reserved
Above 1 MB Memory Test      : Disabled  HDD auto sleep setting      : 3 min.
Hard Disk Type 47 RAM Area  : 0:300     Trackball (COM2)            : Enabled
Wait For <F1> If Any Error  : Enabled   Paralled Port (LPT1)        : Standard
System Boot Up Num Lock     : Off       Notebook Audio function     : Enabled
Floppy Drive Seek At Boot   : Disabled  PCMCIA Boot Function        : Disabled
Password Checking Option    : Setup     BootSector Virus Protection: Enabled
Adaptor ROM Shadow C000,16K: Disabled
Adaptor ROM Shadow C400,16K: Disabled
Adaptor ROM Shadow C800,16K: Disabled
Adaptor ROM Shadow CC00,16K: Disabled
Adaptor ROM Shadow D000,16K: Disabled
Adaptor ROM Shadow D400,16K: Disabled
Adaptor ROM Shadow D800,16K: Disabled
Adaptor ROM Shadow DC00,16K: Disabled
Video   ROM Shadow E000,64K: Enabled
System  ROM Shadow F000,64K: Enabled
<Fn> special function key   : Enabled
LCD auto sleep setting      : 3 min.
      ESC:Exit ↓ ↑ ←:Sel  (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color
      F5:Old Values F6:BIOSSetup Defaults    F7:Power-On Defaults
```

Figure 4-9 *The Advanced CMOS Setup*

1. Above 1 MB Memory Test

To test the memory that is above 1 MB during the system boot, select **Enabled**; otherwise, select **Disabled**.

2. Hard Disk Type 47 RAM Area

Select location to store/save the user defined hard disk type (47) at either **0:300** or **DOS 1KB**.

3. Wait For <F1> If Any Error

To halt the system if the POST detects any error during system boot, select **Enabled**; otherwise, select **Disabled**.

4. System Boot Up Num Lock

To boot the system with the embedded numeric keypad activated, select **Enabled**; otherwise, select **Disabled**.

5. Floppy Drive Seek At Boot

To test the floppy diskette drive during system boot, select **Enabled**; otherwise, select **Disabled**.

6. Password Checking Option

To perform password security check at system and *Setup* levels, select **Always**. To perform password security check at *Setup* level, select **Setup**.

To set or change a password, enter ***Change Password*** in the main *Setup* menu. (Refer to pages 4-32 to 4-33 for a detailed description on setting or changing a password.)

7. Adaptor ROM Shadow C000, 16K (and)

8. Adaptor ROM Shadow C400, 16K (and)

9. Adaptor ROM Shadow C800, 16K (and)

10. Adaptor ROM Shadow CC00, 16K (and)

11. Adaptor ROM Shadow D000, 16K (and)

12. Adaptor ROM Shadow D400, 16K (and)

13. Adaptor ROM Shadow D800, 16K (and)

14. Adaptor ROM Shadow DC00, 16K (and)

15. Video ROM Shadow E000, 64K (and)

16. System ROM Shadow F000, 64K

Fields 7 to 16 deal with ROM shadowing. This function allows the user to copy ROM codes to RAM to speed processing. (Codes can be executed much faster at RAM than at ROM.)

Two blocks of RAM, C000-CFFF & D000-DFFF, (fields 7-14) can be used for option ROM shadowing. To use any of the blocks of RAM for ROM shadowing, select **Enabled**; otherwise, select **Disabled**.

Blocks of RAM, E000-EFFF & F000-FFFF, (Fields 15 & 16) can be used for video and system ROM shadowing. If you want the video ROM shadowed, select **Enabled**; otherwise, select **Disabled**. If you want the system ROM shadowed, select **Enabled**; otherwise, select **Disabled**.

17. <Fn> special function key

The **Fn** function key is specific to the notebook. The system supports various display and power saving features. All the display features and one of the power-saving features, **Standby** feature, are accessed via the specially-designed **Fn + <key>** key combinations. See pages 3-12 & 3-13 for a description of display features and page 3-17 for **Standby** feature. These key combinations do not take effect until the **Fn** key is enabled. If you want the **Fn** key enabled, select **Enabled**; otherwise, select **Disabled**.

Caution:

It is important that the **Fn** key should be disabled before you install and when you run either OS/2 or Windows NT.

18. LCD auto sleep setting

The system can automatically ***turn off power to the LCD backlight***, the most power consuming of all the LCD screen's electronic parts, after a certain period of time during which the system remains inactive. Enter the time of system inactivity after which the LCD backlight will be turned off. Select a value **between 1 min and 20 min**. If you want the feature disabled, select "**Disabled**".

19. HDD auto sleep setting

The system can automatically ***turn off power to the hard disk motor***, the most power consuming of all the hard disk's electronic parts, after a certain period of time during which the system remains inactive. Enter the time of system inactivity after which the hard disk motor will be turned off. Select a value **between 1 min and 20 min**. If you want the feature disabled, select "**Disabled**".

20. Trackball (COM2)

To boot the system with the trackball activated, select **Enabled**; otherwise, select **Disabled**. (The trackball must be enabled and configured before it is fully activated.)

21. Parallel Port (LPT1)

The parallel print port can be set in any of the four modes: **Standard**, **Bi-Dir**, **EPP** and **ECP**.

22. Notebook Audio function

To activate the notebook's audio board, select **Enabled**; otherwise, select **Disabled**.

☞ **Note:**

Besides the proprietary audio board, the notebook can accommodate an audio board which more suits your needs via its expansion unit, the optional Docking Station. To use the audio board installed in the Docking Station, the notebook's internal audio function should be disabled first.

23. PCMCIA Boot Function

To set the booting priority *Priority Order II*, select **Enabled**. To set the booting priority *Priority Order I*, select **Disabled**. Refer to pages 4-3 & 4-4 for a detailed description on booting priority orders.

24. BootSector Virus Protection

To activate the boot sector virus warning protection, select **Enabled**. When there is an attempt to alter the hard disk's boot sector, the system will display the warning message:

> **<WARNING, Disk boot sector is to be modified. Type "Y" to accept, any key to abort.>**

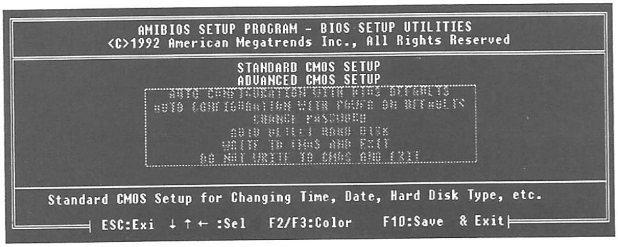
If the user purposely sets the alteration or if the user is installing any operating system to the hard disk, press "**Y**" to confirm the modification.

Otherwise, press any key other than "Y" to avoid alterations made to the disk boot sector. The hard disk most likely has been contaminated with a virus. Perform all necessary procedures to clean the system.

To deactivate this protection, select **Disabled**.

Other Features

Other than the *Standard CMOS Setup* and the *Advanced CMOS Setup*, the *Setup* menu offers six other *Setup* sub-menus.



```
            AMIBIOS SETUP PROGRAM - BIOS SETUP UTILITIES
        <C>1992 American Megatrends Inc., All Rights Reserved

                        STANDARD CMOS SETUP
                        ADVANCED CMOS SETUP
              AUTO CONFIGURATION WITH BIOS DEFAULTS
            AUTO CONFIGURATION WITH POWER ON DEFAULTS
                          CHANGE PASSWORD
                       AUTO DETECT HARD DISK
                       WRITE TO CMOS AND EXIT
                   DO NOT WRITE TO CMOS AND EXIT

  Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.
      ESC:Exi  ↓ ↑ ← :Sel   F2/F3:Color    F10:Save  & Exit
```

Figure 4-10 *Setup's six other sub-menus*

They are:

- *Auto Configuration with BIOS Defaults*
- *Auto Configuration with Power-On Defaults*
- *Change Password*
- *Auto Detect Hard Disk*
- *Write to CMOS and Exit*
- *Do Not Write to CMOS and Exit.*

Refer to **Tables 4-4** to **4-6** for commands of accessing, changing, and exiting sub-menus and fields in *Setup*.

Auto Configuration with BIOS Defaults

Set "**Y**," the BIOS configuration defaults will be automatically loaded.

Auto Configuration with Power-On Defaults

Set "**Y**," the Power-On configuration defaults will be automatically loaded.

Change Password

Setting Password: A password up to six (6) characters and/or numbers can be entered. However, do not use symbols, slashes, blank spaces, punctuation marks, and etc. The system will ask you to enter the same password again for confirmation.

Once the password has been set and saved (use **F10** at the main *Setup* screen), the system allows you three (3) chances to enter the password when entering either the system level or *Setup*. However, if after three trys the correct password has not been entered, the system will ask you to enter the ROM password: **AMI_SW** (the system's default password for users who forget their own). If the incorrect ROM password is entered, then the system will not allow you to enter either the system level or *Setup* (depending on which level the protection is set, see "Password Checking Option," page 4-26).

Changing Password: To change a password, enter the ***Change Password*** sub-menu and enter a new password. Confirm the new password as requested. (The old password does not have to be disabled first. The system will override the old password with the new password.)

Disabling Password: To disable a password, enter the ***Change Password*** sub-menu and press **Enter** at the **Enter NEW Password** screen. A message will be displayed to indicate that the password has been disabled.

Auto Detect Hard Disk

Upon entering this sub-menu, the system will automatically check and display the hard disk's parameters. Press "Y" to write the parameters to the ***Hard Disk C*** field or "N" to leave this sub-menu. To save the detected parameters, press **F10** at the main *Setup* screen.

Caution:

Since the hard disk is removable, it is very likely that you will use different hard disks on different occassions. Every time you install any hard disk in the notebook, it should be configured via *Setup*.

The ***Auto Detect Hard Disk*** feature may provide you with a different set of parameters for the same hard disk on each try. However, *the same hard disk should be reconfigured with the same parameters that were first used to configure it. Reconfiguring the same hard disk with a different set of parameters may lead to its inability to work.*

Be sure to take note of the paramaters you first detected on the label on your hard disk casing for future reconfiguration use.

Write to CMOS and Exit

To exit *Setup* with modifications saved (same as pressing the **F10** key at the main *Setup* menu). The system will reboot itself and the new defaults will take effect.

Do Not Write to CMOS and Exit

To exit *Setup* without any modification saved (same as pressing the **Esc** key at the main *Setup* menu).

Appendix A Specifications

Standard

CPU	Intel's Pentium
CPU speed	66MHz or 60MHz
Onboard RAM	8 MB
Expandable to	16 MB or 40 MB
System and video ROM	128 KB
Video RAM controller	1MB
PCMCIA 2.01 sockets	2 sockets (one for Type I, Type II, or Type III card and the other for Type I or Type II card)
I/O ports	1 serial port (9-pin, RS-232C) 1 parallel port (25-pin) 1 external monitor port (15-pin) 1 external keyboard port (PS/2 compatible) 1 expansion port (200-pin)
Trackball	Microsoft mouse mode compatible (software) Microsoft serial mouse compatible (hardware)

Standard

Power supply	Universal, auto-sensing switching type
input	90-270VAC @50-60Hz
Power	40W
Output	
Main	20VDC, 2A
Battery Charge	25VDC, 1.6A (constant current)
Battery Pack	Ni-MH or Ni-Cd type
Recharge Time	2 hours
Life	2 hours (Ni-MH) and 1.5 hours (Ni-Cd) — TFT color model 2 hours (Ni-MH) and 1.5 hours (Ni-Cd) — Dual-scan color model 2.5 hours (Ni-MH) and 2 hours (Ni-Cd) — Monochrome model
Voltage	19.2V
Diskette drive	3 1/2-inch (1.44MB x 1)
Hard disk drive	2 1/2-inch (250MB, 17ms x 1)
Keyboard	86-key with numeric keypad functions
Operating temp.	0°C to 35°C
Storage temp.	-10°C to 50°C

Standard

Operating humidity	20% to 85%, non-condensing
Storage humidity	0% to 90% non-condensing
Altitute	8000 feet
Weight	3.8 Kgs — TFT color model 3.7 Kgs — Dual-scan color model 3.6 Kgs — Monochrome model
Size	283.5mm(W) x 262.5mm(D) x 60mm(H)
Shock	2G (10 ± microseconds pulse duration)

Appendix B I/O Port Connectors

Serial Port (COM 1)

Pin No.	Signal Name	I/O	Description
1	DCD	I	data carrier detect
2	RD	I	received data
3	SD	O	transmitted data
4	DTR	O	data terminal ready
5	GND	—	signal ground
6	DSR	I	data set ready
7	RTS	O	request to send
8	CTS	I	clear to send
9	RI	I	ring indicator

Video Port

Pin No.	Signal Name	I/O	Description
1	R	O	analog red
2	G	O	analog green
3	B	O	analog blue
4			n.c.
5			n.c.
6	R-GND	O	analog red return
7	G-GND	O	analog green return
8	B-GND	O	analog blue return
9			n.c.
10	GND	—	ground
11			n.c.
12			n.c.
13	HSY	O	horizontal sync
14	VSY	O	vertical sync
15			n.c.

Parallel Printer Port

Pin No.	Signal Name	I/O	Description
1	-STROBE	O	data strobe
2	D0	O	data bit 0
3	D1	O	data bit 1
4	D2	O	data bit 2
5	D3	O	data bit 3
6	D4	O	data bit 4
7	D5	O	data bit 5
8	D6	O	data bit 6
9	D7	O	data bit 7
10	-ACK	I	acknowledge
11	BUSY	I	busy
12	PE	I	p. end (out of paper)
13	SLCT	O	select
14	-AUTOFD	O	auto feed
15	-ERROR	I	error
16	-INIT	O	initialize printer
17	-SLCTIN	O	select input
18-25	GND	—	ground

Appendix C **VGA Modes of Operation**

IBM Standard VGA Modes (CRT)

Mode (hex)	Number of Colors	Screen Format	Display Mode	Monitor Supported
0,1	16/256K	360 x 400	text	all
2,3	16/256K	720 x 400	text	all
4,5	4/256K	320 x 200	graphics	all
6	2/256K	640 x 200	graphics	all
7	mono	720 x 400	text	all
D	16/256K	320 x 200	graphics	all
E	16/256K	640 x 200	graphics	all
F	mono	640 x 350	graphics	all
10	16/256K	640 x 350	graphics	all
11	2/256K	640 x 480	graphics	all
12	16/256K	640 x 480	graphics	all
13	256/256K	320 x 200	graphics	all

Notes:

all refers to PS/2 compatible monitors supporting a horizontal sync frequency of 31.5 kHz.

IBM Standard VGA Modes (LCD)

Mode (hex)	Number of Shades	Number of Pixels	Expand Size	Display Mode
0,1	16/16	360 x 400	640 x 475	text
2,3	16/16	720 x 400	640 x 475	text
4,5	4/64	320 x 200	640 x 475	graphics
6	2/16	640 x 200	640 x 475	graphics
7	2/16	720 x 400	640 x 475	text
D	16/64	320 x 200	640 x 475	graphics
E	16/16	640 x 200	640 x 475	graphics
F	2/16	640 x 350	640 x 475	graphics
10	16/16	640 x 350	640 x 475	graphics
11	2/16	640 x 480	640 x 480	graphics
12	16/16	640 x 480	640 x 480	graphics
13	64/64	320 x 200	640 x 475	graphics

Notes:

all refers to PS/2 compatible monitors supporting a horizontal sync frequency of 31.5 kHz.

Appendix D **Keyboard Scan and ASCII Codes**

Key	Scan Code	ASCII	Key	Scan Code	ASCII
a	1E	61	A	1E	41
b	30	62	B	30	42
c	2E	63	C	2E	43
d	20	64	D	20	44
e	12	65	E	12	45
f	21	66	F	21	46
g	22	67	G	22	47
h	23	68	H	23	48
i	17	69	I	17	49
j	24	6A	J	24	4A
k	25	6B	K	25	4B
l	26	6C	L	26	4C
m	32	6D	M	32	4D
n	31	6E	N	31	4E
o	18	6F	O	18	4F
p	19	70	P	19	50
q	10	71	Q	10	51
r	13	72	R	13	52
s	1F	73	S	1F	53
t	14	74	T	14	54
u	16	75	U	16	55
v	2F	76	V	2F	56
w	11	77	W	11	57
x	2D	78	X	2D	58

Key	Scan Code	ASCII	Key	Scan Code	ASCII
y	15	79	Y	15	59
z	2C	7A	Z	2C	5A
1	02	31	!	02	21
2	03	32	@	03	40
3	04	33	#	04	23
4	05	34	$	05	24
5	06	35	%	06	25
6	07	36	^	07	5E
7	08	37	&	08	26
8	09	38	*	09	2A
9	0A	39	(	0A	28
0	0B	30	)	0B	29
F1	3B	00	(shift) F1	54	00
F2	3C	00	(shift) F2	55	00
F3	3D	00	(shift) F3	56	00
F4	3E	00	(shift) F4	57	00
F5	3F	00	(shift) F5	58	00
F6	40	00	(shift) F6	59	00
F7	41	00	(shift) F7	5A	00
F8	42	00	(shift) F8	5B	00
F9	43	00	(shift) F9	5C	00
F10	44	00	(shift) F10	5D	00
‘	29	60	~	29	7E
-	0C	2D	Underline	0C	5F
=	0D	3D	+	0D	2B
Backspace	0E	08			
Tab (right)	0F	09	Tab (left)	0F	00
[	1A	5B	{	1A	7B

Key	Scan Code	ASCII	Key	Scan Code	ASCII
]	1B	5D	}	1B	7D
\	2B	5C	|	2B	7C
;	27	3B	:	27	3A
'	28	27	"	28	22
Enter	1C	0D			
,	33	2C	<	33	3C
.	34	2E	>	34	3E
/	35	2F	?	35	3F
↑	48	00			
↓	50	00			
→	4D	00			
←	4B	00			
PgUp	49	00			
PgDn	51	00			
Home	47	00			
End	4F	00			
Del	53	00			
Ins	52	00			

Glossary

This glossary provides definitions for terms which may be new to you.

Adapter (1) A device that allows compatibility between different equipment. (2) A printed circuit board that connects a system board to a peripheral I/O device (devices) or adds specialized functions to the system.

Address An identification, such as a label, number, or name that designates a particular location in storage or any other data destination or source.

ASCII An acronym for AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE. A 7-bit standard code adopted to facilitate the interchange of data among various types of data processing and data communications equipment.

Attribute (1) A word that describes the manner in which a variable is handled by the computer. (2) A characteristic quality of a data type, data structure, element of a data model, or system. (3) A feature of a device.

BIOS An acronym for BASIC INPUT/OUTPUT SYSTEM. In some operating systems, the part of the program that customizes it to a specific computer.

Boot Derives from "bootstrap". To start or restart a computer system by reading instructions from a storage device into the computer's memory. If the computer is already turned on, it's a "warm boot;" if not, it's a "cold boot."

Cache memory A small high-speed memory for the temporary storage of information, usually used between a slower large memory and a fast central processing unit.

Configure To assemble a selection of hardware or software into a system and to adjust each of the parts so that they all work together.

Configuration An assembly of machines that are interconnected and are programmed to operate as a system. The layout or design of elements in a hardware or information processing system.

CPU Central processing unit. The component of a computer system with the circuitry to control the interpretation and execution of instructions.

Disk drive A device that reads data from a magnetic disk and copies it into the computer's memory so that it can be used by the computer, and that writes data from the computer's memory onto a disk so that it can be stored.

DOS An acronym for **D**ISK **O**PERATING **S**YSTEM. A specialized, disk-oriented program that provides an easy-to-use link between the user and a computer's disk drive.

DRAM Dynamic RAM. Storage that the computer must refresh at frequent intervals.

Driver A series of instructions the computer follows to reformat data for transfer to and from a particular peripheral device. The electrical and mechanical requirements are different from one kind of device to another, and software drivers are used to standardize the format of data between them and the central processor.

External option An device attached to the outside of the system unit which extends and enhances its operation. Ex.: printer or mouse.

Internal option A part installed inside the system unit cover which enhances operation of the system such as an adapter and a memory chip.

Interrupt A signal that, when activated, causes the hardware to transfer the program control to some specific location in main storage, thus breaking the normal flow of the program being executed.

KB 1024 bytes.

LCD An abbreviation for LIQUID CRYSTAL DISPLAY. A way to make letters and number appear by reflecting light on a special crystalline substance. It features high visibility in high illumination levels but no visibility in low illunimation levels.

Load In programming, enter data into storage or working registers.

MB 1,048,576 bytes.

Memory The storage facilities of the computer, capable of storing vast amounts of data.

Microprocessor The basic arithmetic, logic, and control elements required for processing (generally contained on one integrated circuit chip). Microprocessors are widely used as the control devices for microcomputers, household appliances, and thousands of other devices.

Mode A method or condition of operation.

Monitor A video display which comprises a CRT (cathode ray tube) and associated circuitry.

Mouse A device for moving a cursor or other object around on the display screen. A typical mouse has one or more buttons on the top of a small box that can be moved around on a flat surface. The mouse's main advantage is that it can move a cursor around on the screen with great precision.

Notebook computer A briefcase-sized computer that uses a flat panel liquid crystal display. It is about the size of a large book.

Parallel printer A printer that receives information from the computer one character (letter, number, etc.) at a time through eight wires. Additional wires are needed to exchange control signals.

Parameter An arbitrary constant. A variable in an algebraic expression that temporarily assumes the properties of a constant.

POST Power-On-Self-Test. A sequence of self-test automatically run by the computer whenever it is turned on or is reset.

RAM An acronym for **R**ANDOM **A**CCESS **M**EMORY, a memory into which the user can enter information and instructions (write), and from which the user can call up data (read). RAM is the "working memory" of the computer, into which applications programs can be loaded from outside and then executed.

ROM An acronym for **R**EAD-**O**NLY **M**EMORY. Generally, a solid state storage chip that is programmed at the time of its manufacture and that cannot be reprogrammed by the computer user.

Routine A short set of program codes that perform a specific task.

Serial port An input/output port in a computer through which data is transmitted and received one bit at a time.

Setup (1) In a computer that consists of an assembly of individual computing units, the arrangement of interconnections between the units, the adjustments needed for the computer to operate. (2) The preparation of a computing system to perform a job or job step. Setup is usually performed by an operator and often involves performing routine functions. (3) The preparation of the system for normal operation.

Utility A program that helps the user run , enhance, create, or analyze other programs, programming languages, operating systems, and equipment. Utilities are designed to facilitate or aid the operation and use of the computer for a number of different applications and uses.

VGA Video graphics adapter. Video system that allows simultaneous display of up to 256 colors in 640 x 480 graphics resolution and 720 x 400 text resolution.

72-36000-011

Printed in Taiwan

NP3650 Series Attachment

- Page 3-12, line7
  "1728 X 1024" should be changed to "1280 X 1024".

- Page 3-14, lines 3 & 4
  "1728 X 1024" should be changed to "1280 X 1024".

- Page 3-20
  Add the following paragraph to the end of the page:

- MS-DOS's mouse driver, MOUSE.COM, can also be used to configure the trackball for use in the DOS environment. Since the trackball is electronically *connected to serial port COM2*, you should add the *parameter "2" to your command* (i.e., GMOUSE 2) when you want to activate the trackball with the MOUSE.COM mouse driver.

- Page A-2, line 16
  "14.4V" should be changed to "19.2V".

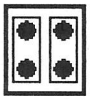
- Audio Dip Switch Setting: (U4)

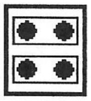
	I/O ADDRESS		DMA	
	220H	240H	DMA 1	DMA 3
U4-1	ON	OFF		
U4-2	ON	OFF		
U4-3	OFF	ON		
U4-4	OFF	ON		
U4-5			ON	OFF
U4-6			ON	OFF
U4-7			OFF	ON
U4-8			OFF	ON

☞ IRQ Interrupt is fixed on IRQ 2 or IRQ 9.

- CPU Clock Jumper Setting: (JP22)

66 MHz CPU :	Pin 1-3 close, 2-4 close.
60 MHz CPU :	Pin 1-2 close, 3-4 close.


66 MHz CPU


60 MHz CPU

- **NP3650 series equipped with thermal control CPU cooling fan which will not spin when the CPU temperature is cold or warm.**

- **The NP3650 series Notebook computer will only charge the battery while the machine is OFF.**

- **If your battery can not recharge after reinsert or swap a battery, please do the following:**

  1. **Be sure the battery protective mylar is removed.**
  2. **Make sure the battery is properly inserted into battery compartment.**
  3. **Unplug the AC Adapter from Notebook.**
  4. **Reconnect the AC Adapter to Notebook.**